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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LEONID KRASNY, KARL MOLNAR, JUNG-FU THOMAS CHENG, STEPHEN GRANT, and YI-PIN ERIC WANG

Appeal 2010-009877
Application 11/045,877
Technology Center 2600

Before THU A. DANG, JAMES R. HUGHES, and GREGORY J. GONSALVES, *Administrative Patent Judges*.

GONSALVES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the final rejection of claims 30-32, 34, 39, 41, 45, 46, 48, 58-60, 62-67, and 70-76 (App. Br. 2). Claims 1-29, 35-38, 40, 42-44, 47, 49-51, 55-56, and 80 were cancelled (*id.*). Claims 52-54 and 57 were allowed and claims 33, 61, 68, 69, 77-79, and 81-85 were objected to as depending from a rejected base claim (*id.*). We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

The Invention

Exemplary claim 30 follows:

30. A base station comprising:

> a transmitter having a plurality of transmit antennas;
>
> a transmission control circuit operatively coupled to the transmitter and configured to:
>
> > select a desired feedback mode to be one of a rich feedback mode and a limited feedback mode, and configure said transmitter to use per antenna rate control if the limited feedback mode is selected;
> >
> > select a diversity mode by selecting a subset of a set of transmit antennas to use for transmission to the mobile station when the limited feedback mode is selected; and
> >
> > configure the base station transmitter to use the selected antennas for transmission to said mobile station when the limited feedback mode is selected; and
>
> a receiver to receive a diversity mode selection from a mobile station indicating a selected diversity mode, wherein the

> transmission control circuit configures the transmitter for the selected diversity mode responsive to receipt of the diversity mode selection from the mobile station.

Claims 30-32, 34, 39, 45, 46, 48, 58-60, 62-67, 70, and 71 stand rejected under 35 U.S.C. § 103(a) as being unpatententable over Onggosanusi (Onggosanusi et al, "Performance Analysis of Closed-Loop Transmit Diversity in the Presence of Feedback Delay," 49 IEEE Transactions on Communications, 1618-1630 (Sept. 2001)), Chung (Chung et al, "Approaching Eigenmode BLAST Channel Capacity Using V-BLAST with Rate and Power Feedback," IEEE, 915-919, (2001)), and Heath (Heath et al, "Antenna Selection for Spatial Multiplexing Systems with Linear Receivers," 5 IEEE Communications Letters, 142-144 (2001)) (Ans. 4-8).

Claims 31, 41, 59, 64-67, and 72-76 stand rejected under 35 U.S.C. § 103(a) as being unpatententable over Onggosanusi, Chung, Heath, and Lu (European Pat. App. No. 1 351 414) (Ans. 8).

Claims 32 and 60 stand rejected under 35 U.S.C. § 103(a) as being unpatententable over Onggosanusi, Chung, Heath, and Alexiou (U.S. Pat. App. Pub. No. 2005/0020237) (Ans. 8).

FACTUAL FINDINGS

We adopt the Examiner's factual findings as set forth in the Answer (Ans. 3, *et seq.*).

ISSUE

Appellants' responses to the Examiner's positions present the following issue:

Did the Examiner err in finding that the combination of Onggosanusi, Chung, and Heath teaches or suggests "a rich feedback mode" and "a limited feedback mode," as recited in independent claim 30 and as similarly recited in independent claims 45 and 58?

ANALYSIS

Obviousness Rejection Of Claims 30-32, 34, 39, 45-46, 48, 58-60, 62-67, 70, and 71 over Onggosanusi, Chung, and Heath

Appellants contend that the Examiner erred in rejecting independent claims 30, 35, and 58 over the combination of Onggosanusi, Chung and Heath because "none of those references, alone or in combination, teaches or suggests a base station that includes both a 'rich feedback mode' and a 'limited feedback mode,' as claimed" (App. Br. 7). In support of their contention, Appellants argue that "[a]ccording to the cited references, the term 'closed-loop feedback' (which the Examiner equates to the claimed 'rich feedback')[] is used to mean that a transmitter is provided with some feedback. The term 'open-loop feedback' (which the Examiner equates to the claimed 'limited feedback')[] is used to mean that the transmitter receives <u>*no feedback*</u> at all" (*id.*). Appellants further argue that "[w]hether Onggosanusi teaches or suggests that one could combine both open-loop and closed-loop schemes does not matter when Onggosanusi explicitly teaches that only one of those schemes provides feedback while the other does not" (*id.*at 8-9).

The Examiner concluded, however, that the combination of references teaches both a rich feedback mode and a limited feedback mode because "Onggosanusi teaches Closed Loop, Open Loop and a 'combination' of the two. Hence one skilled can see that this combined design would fall

somewhere between the two (eg. provides more data than 'no data' as per Open Loop but would provide 'less data' than Closed Loop)" (Ans. 9). We agree with the Examiner's conclusion. Our reviewing Court requires us to give a claim its broadest reasonable meaning consistent with the Specification. *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). Appellants' Specification indicates that the claimed "limited feedback mode" and the term "open loop" are interchangeable: "MIMO systems can be broadly classified as limited feedback (also known as open loop) and rich feedback (also known as closed loop) systems" (¶ [004]).

Onggosanusi not only discloses both open loop and closed loop systems but also discloses a system that is a combination of the two: "One may try to 'combine' open- and closed-loop schemes by using different orthogonal spreading waveforms for different transmit antennas with a beamformer" (p. 1622). That is, Onggosanusi discloses a closed loop scheme as the claimed rich feedback and a scheme that is a combination of closed loop and open loop that provides less feedback than the closed loop scheme and, therefore, qualifies as the claimed limited feedback.

Accordingly, we find no error in the Examiner's rejection of independent claims 30, 45, and 58 as well as claims 31, 32, 34, 39, 46, 48, 59, 60, 62-67, 70, and 71 dependent therefrom because Appellants did not set forth any separate patentability arguments for those dependent claims (*see* App. Br. 6-14).

Obviousness Rejection Of Claims 31, 41, 59, 64-67, and 72-76 Over Onggosanusi, Chung, Heath, and Lu

Appellants argue that the Examiner in rejecting claims 31, 41, 59, 64-67, and 72-76 as obvious because "[a]lthough Lu does poll a station to

determine its capabilities, there is nothing in this cited passage, or in the entire reference of Lu, that even remotely suggests using the determined capabilities for selecting antennas/subsets of antennas based on the feedback mode" (App. Br. 15-16). The Examiner concluded, however, that the combination of references teaches the disputed claimed limitation (Ans. 17-18). The Examiner reasoned that "Lu polls the device to determine its capability and then adapts the configuration such that it conforms to said mobile's capability" (*id.* at 18).

We agree with the Examiner's conclusion and reasoning. Lu teaches selecting antennas/subsets of antennas based on the mobile's capabilities by disclosing that "[i]f the polled station has MIMO capability, the polling station can command the polled station to respond with its MIMO capability" (¶ [0030]). That is, Lu discloses selecting a Multiple Input Multiple Output capability (i.e., multiple input and output antennas) for a mobile if the mobile has that capability. Moreover, as discussed *supra*, Onggosanusi teaches rich feedback and limited feedback modes.

Accordingly, the claim limitation of selecting antennas based on the feedback mode is a combination of the familiar element of selecting antennas based on a mobile's capabilities as taught by Lu and the rich and limited feedback capabilities taught by Onggosanusi that would have yielded predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Thus, we find no error in the Examiner's obviousness rejection of claims 31, 41, 59, 64-67, and 72-76.

Obviousness Rejection Of Claims 32 and 60 Over Onggosanusi, Chung, Heath, and Alexiou

Appellants argue that the Examiner in rejecting claims 32 and 60 because "nowhere in Alexiou does it ever mention that a transmission control circuit at a base station selects a desired feedback mode based at least in part on mobile station speed or velocity" (App. Br. 16). But the Examiner concluded that Alexiou teaches that "the speed/velocity of the mobile device will have an impact on the feedback scheme, hence one type of feedback works better than the other type depending upon speed/velocity and one skilled would seek to switch between the two types (as taught by the other prior art)" (Ans. 17).

We agree with the Examiner's conclusion and underlying findings of fact. Alexiou discloses that "[w]hen a mobile user terminal moves at high speed, the combined effects of channel estimation, power control, quantisation and feedback delay, prevent feedback schemes which are 'closed loop', i.e. involving feedback from the receiver to the transmitter, from accurately tracking rapid channel fluctuations" (¶[0003]). That is, in light of Alexiou's teaching, one of ordinary skill in the art would have been motivated to design a mobile that uses a feedback scheme other than the closed loop or rich feedback such as the limited feedback scheme taught by Onggosanusi. Accordingly, we find no error in the Examiner's obviousness rejection of claims 32 and 60.

DECISION

We affirm the Examiner's decision rejecting claims 30-32, 34, 39, 41, 45, 46, 48, 58-60, 62-67, and 70-76 as unpatentable under 35 U.S.C. §103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

peb